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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT CONDITIONS
IN THE YELLOWSTONE NATIONAL PARK

Season 1930

By
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Coeur d'Alene, Idaho
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INTRODUCTION

For a number of years the Bureau of Entomology has followed the practice of submitting to the National Park Service a somewhat formal report covering the status of insect conditions within the forest of the Yellowstone National Park. In the continuation of this practice, it is fully realized that most of the information given in this report has been previously reported, as all situations requiring any action were reported upon and handled directly in the field. However, as this report seems to complete this information, making it available for all offices concerned, it is believed that the practice of submitting an annual report, for an area as important as the Yellowstone, should be continued.

Lodgepole needle tyer (*Bulla* sp.)
Lodgepole sawfly (*Neodiprion* sp.)

No change has occurred in the status of these two insects within the lodgepole pine stands at West Yellowstone during the past season. Considerable needle tyer work is still in evidence, but the outbreak would seem to be in a normal status and causing no serious injury to the trees. A few sawflies can be found but they are very few in number, and causing no noticeable injury to the trees. There seems to be no indication of a recurrence of the epidemic which occurred a few years ago.

Spruce Budworm (*Carposia fumiferana* Clem)

The outbreak of this insect which existed some few years ago along the Yellowstone River, has apparently ceased to exist. However, large areas of dead Douglas fir can still be seen as mute reminders of the seriousness of the outbreak.

The severe outbreak of the spruce budworm in the lodgepole pine stands within the southwest corner of the park continued during the 1930 season. Data secured during the past season would indicate that from 10 to 15 per cent of the infested trees within the infested area are either dead or dying. The destruction which will result from this outbreak is of course difficult to foresee. However, one may be assured that should it continue for a few years more, a large per cent of the trees within the infested area will be destroyed.

In the Cody Canyon, the severe epidemic of this insect within the Douglas fir forests of that region continued during the 1930 season, though in some areas the damage did not seem to be quite so severe as in 1929. A rather extensive spraying program was instituted against the budworm in this

area during the past season, with rather unsatisfactory results. This insect is going to prove to be a very difficult one to destroy through the application of a stomach poison, due to the difficulty of securing a good coverage on the new foliage, and the fact that the larvae feed at the base of the needles. During the 1931 season, a more fundamental study of this problem will be conducted in the hopes that some method of control can be developed which will be feasible to use for the protection of trees of high scenic value.

Douglas Fir Beetle (Dendroctonus pseudotsugae)

The outbreak of the Douglas fir beetle which occurred in the trees weakened by the spruce budworm along the Yellowstone River, has been carefully watched for fear that it might spread into the uninjured Douglas fir forests adjacent. There seems to be no indication of such an occurrence, other than a normal level which one would expect to find within an old forest of this character. However, this area should be kept under rather careful observation for a few more years.

Oregon Digrafter Beetle (Ips oregoni)

Throughout the lodgepole pine stands of the Park there are scattered trees which are infested with Ips. Very few of these attacks can be considered as being primary as most of the trees show previous injuries from other sources. Some of the most common of these mechanical injuries are the result of scorching from fires employed in roadside clean-up, the piling of dirt around the base of trees, from road gradings, or excavations for buildings, the injury to the soil, roots, and base of trees in camp grounds resulting from tourist travel, and the injurious actions

of geyser formations, etc. However, throughout the park there were fewer trees killed by these insects in 1930 than during the past three seasons.

At Old Faithful camp grounds there were some infested trees recorded, which were reported to Chief Ranger Bagley, who had them promptly treated. There were also a few trees to be seen at the Thumb and a scattered tree or two to be seen at some of the other camp grounds, but in all the situation appeared far more satisfactory than during previous years. The treatment of these trees, where in many cases the insects are not primary, raises an issue as to its justification. Though the position of the writer relative to this ^{issue} has been stated in previous reports, it would seem that it could well be repeated at this time.

Ips oregoni is usually regarded as a secondary enemy of our pine forests, as it usually attacks decadent or dying trees. Under certain favorable conditions, which usually consist of an abundance of suitable host material, the broods often develop in such numbers that for a short time the insect becomes primary and attacks and destroys apparently healthy trees. Though the death of a large per cent of the trees within the Park, which have been attacked by Ips, was assured as a result of injuries previously received, the insects undoubtedly hastened their destruction by a number of years. Around many of the geyser formations, this loss of trees is practically unavoidable, as conditions are constantly being developed due to the changing of the formation which makes plant life impossible. Though the development of trees growing under such conditions is arrested, and their death assured as a result of the injuries they have received, many of them would live for years unless attacked by insects. It has been recommended that when such weakened trees are attacked by insects that they

be promptly treated. This recommendation has been based upon the premise that by keeping the number of these insects to the lowest possible minimum, the life of these weakened trees will be prolonged, and epidemics prevented from developing, which might not only destroy large numbers of the weakened trees in one year, but could spread into areas of healthy trees adjacent. In defense of this practice it is rather apparent that during the period this policy has been in force satisfactory progress has been made, as evidenced in the decreased number of Ips-killed trees occurring during the past few seasons. Furthermore, as from a sanitary viewpoint these trees should be removed, it is best that they be cared for at a time when the insects infesting them will be destroyed. This statement has been offered to clarify the writer's position relative to the recommendation which has been made for the treatment of trees infested with Ips when these insects are not considered as being primary killers.

Alpine Fir Beetle (Dryocoetes confusus)

An outbreak of the Alpine Fir Beetle in the alpine fir forests at Duck Lake, was recorded in 1929. The infested trees occurred in large groups, and it was very evident that a serious epidemic was pending, which, unless checked would result in the destruction of a large per cent of the alpine fir of that region. It was, therefore, recommended that the trees be felled and burned, and some 100 trees were treated in this manner. In 1930, the area was re-examined and some 30 newly attacked trees were found, showing a reduction in the infestation of 92%. The results secured from this little project were very satisfactory as this was the first time that control measures had ever been instituted against this insect. The infested trees are very difficult to locate, as there are no pitch tubes, very little boring dust, and no definite rules of foliage discoloration

which can be followed. There is no doubt but that the 1930 infestation occurred from infested trees showing no external evidence of attack, which were overlooked during the 1929 control operation, as several of these trees were recorded during the 1930 examination. The 1930 infestation was promptly treated, which is hoped will end the trouble in this region. The area will be re-examined in 1931.

Spider Mites (*Bryobia prattiana* Koch)

In 1929 it was found that the Douglas fir trees along the Madison River, at the bridge between West Yellowstone and Madison Junction, were badly infested with a spider mite. No control measures were recommended as the control of this insect is an expensive and difficult operation, and it was not believed that any permanent injury to the trees would follow. Spider mites are always more or less prominent during dry seasons, and it was hoped that the outbreak would die down as a result of natural factors. During the past season the infestation did not appear to be as serious, and the trees seemed to be in much better condition. It is believed that this outbreak will die down as a result of natural causes and that no permanent injury to the trees will follow.

Spruce Sawfly (*Neodactylus*)

Attacks of a sawfly on spruce was recorded along the road between Old Faithful and The Thumb. This defoliation was confined to a few trees and was not at all serious, though it was thought well to watch it closely. During the past season only a few of these insects could be found and there is no indication of an outbreak.

Mammoth Camp Grounds

In 1929, it was found that the limber pine on the camp ground at Mammoth was in a very decadent condition, which was attributed to aphids which were very numerous on the opening buds at that time. The trees were sprayed with nicotine sulphate (Black Leaf 40) and during the late summer and fall appeared to be in a much healthier condition. These trees were examined early in the season of 1930, and many of them found to be heavily infested with spider mites as well as aphids. The trees were sprayed with a combined Velck and nicotine sulphate spray, which seemed to effectively destroy both insects and the trees again appeared to be in a fairly healthy condition during the late summer and fall. However, these trees are growing under such abnormal conditions that they are very susceptible to the attacks of insects. The problem of keeping these trees alive for any great number of years will prove to be a very serious problem, if not an impossibility.

Mountain Pine Beetle (*Dendroctonus monticolae*)

An outbreak of the mountain pine beetle in lodgepole pine was reported by park officials from the Lamar River region in the fall of 1929. Some of these trees were examined in 1930 and found to be infested with the lodgepole pine beetle (*Dendroctonus murrayanae*). However, it is very probable that the mountain pine beetle is also in this area. Later in the season, an outbreak of the mountain pine beetle in the lodgepole forests in the southwest portion of the Park was reported by the district ranger. Recommendations for the control of this outbreak have been made and all of the infested trees will be treated during the coming spring. Mr. T. T. Terrell of this station will spend his entire time in assisting with the

technical phases of this problem.

Yellowstone Aerial Survey

At the present time the lodgepole pine forest of the Yellowstone Park are threatened by epidemics of the mountain pine beetle which exist in adjacent Idaho and Montana forests. The Forest Service is doing everything in its power, through the institution of control measures, to prevent these outbreaks from spreading into the scenic forests of the Yellowstone, and it is essential that every effort be made to prevent the development of a similar situation within the region for which protection is desired. To be sure that there were no serious outbreaks within the park that had been overlooked during the regular work of the park officials, an aerial survey was conducted by the Bureau of Entomology during the month of July. As a result of this survey a few groups of red tops were recorded, some of which were subsequently examined from the ground. However, it was very evident that no serious situation existed. It is planned to repeat this survey during the coming season, which will be followed by two weeks of ground work checking the results secured from the air.

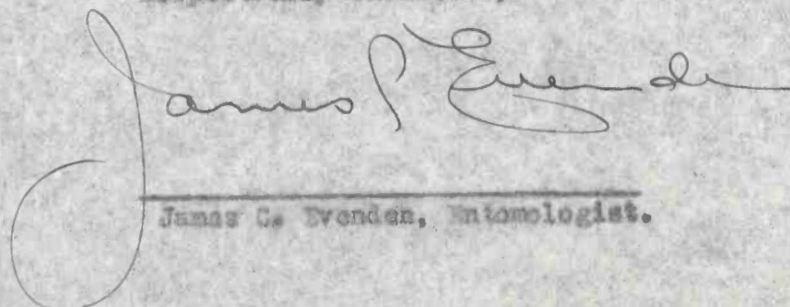
For this survey the Forest Service fire patrol plane was used, and Livingston, Montana, adopted as a base. Three trips were made over the park, amounting to approximately 500 miles exclusive of the flying time from Livingston to Gardiner, a distance of 50 miles. As the nature of the terrain made it necessary to use the Gardiner entrance, there were some 95,000 acres over which the survey was duplicated, and that amount has been deducted from the total area covered. It is estimated that a strip three miles in width was covered on each trip, making a total of 835,000 acres or 38% of the total park acreage.

The cost of the survey exclusive of the time of Bureau officials, and including travel time of plane from Spokane to Livingston, and two days "stand by time" due to rainy weather, amounted to \$130.00. Reducing this charge to an acreage basis we have a cost of .0923 cents per acre. The value of the airplane for surveys of this character cannot be questioned. However, it must be remembered that the data secured is always one year behind the actual status and that if the survey is to be made effective, it should be followed by adequate ground work. No difficulty was experienced in isolating the different tree species, and as the red tops were few and far between, they could be fairly accurately counted and mapped. An attempt will be made to conduct this survey fairly early in July in order that Mr. Terrall, Aerial Entomological Observer of this station, will have at least two weeks during the latter part of July to examine from the ground all of the situations noted.

CONCLUSIONS

In conclusion it can be said that at the present time the threatened invasion of the mountain pine beetle is the most serious situation which confronts the officers in charge of the Yellowstone forest. Every possible effort must be employed to prevent such an occurrence, as it would surely be disastrous to these highly prized scenic forests.

Respectfully submitted,



James C. Evenden, Entomologist.